**Docket No. 5-ES-111**
**Strategic Energy Assessment for January 1, 2021 through December 31, 2028**
**Dairyland Power Cooperative – Supplemental Data Requests**

**Carbon Reduction Activities**

In 2019, Dairyland kicked off a year-long study establishing a carbon reduction goal in relation to our sustainable generation planning efforts. The Sustainable Generation Plan focuses on system reliability on the path to a low-carbon future. The goal had to be achievable while still meeting the safety and reliability requirements of our members. Dairyland's board approved, at the end of 2020, a 50 percent reduction in our carbon dioxide intensity rate by 2030 (from 2005 levels).

Dairyland calculated a carbon intensity rate of 2,135 lbs/MWh for 2005 which amounts to 4,431,874 tons. That high intensity rate was driven largely by a resource mix that was over 90% coal. Between 2005 and present, Dairyland has made significant changes to its portfolio through retiring half of its coal fleet Alma 1-5 (181 MWs) and G3 (345 MWs). In addition, over 350 MW of renewable resources were brought online. The combination of these activities reduced the carbon emission rate to 1,433 lbs/MWh (33% reduction) today and 3,747,426 tons (16% reduction).

Going forward, Dairyland expects to reach a 50% reduction in carbon intensity levels by 2030 from 2005 levels. Dairyland added the Tatanka Ridge Wind Farm (51.6 MWs) in January of 2021 and has a contract in place for the 149 MW Badger State Solar facility coming online in 2023. In addition, Dairyland is investing in natural gas power plants to provide power when the wind isn't blowing, and the sun isn't shining. These plants will enable Dairyland to bring on even more renewable projects, while still providing reliability in times of extreme weather (Polar Vortex). Dairyland is also investing in a new system that will help it maintain and expand Demand Response opportunities and continues to provide significant energy efficiency incentives to their members. Dairyland's cooperative members are also funding focus on energy. Dairyland sees that a push to a more diversified portfolio, is the best strategy to reaching the 50% carbon intensity rate reduction by 2030.

Dairyland's projected carbon emission levels are as follows:

CY 2022 1,423 lbs./MWh (33% reduction); 3,720,495 tons (16% reduction)
CY 2024 1,378 lbs./MWh (35% reduction); 3,632,297 tons (18% reduction)
CY 2026 1,302 lbs./MWh (39% reduction); 3,722,132 tons (16% reduction)
CY 2028 1,096 lbs./MWh (49% reduction); 3,157,725 tons (30% reduction)

**Utility Resource Planning**

Dairyland is using a balanced and pragmatic approach to its Sustainable Generation Plan. The purpose of the plan is to meet the electricity requirements of our members by providing the lowest cost option that can maintain safety and reliability, while working toward meeting a goal of 50 percent reduction in carbon dioxide intensity rate by 2030. The focus is on diversifying the

energy supply portfolio through retirements of coal plants, adding renewables, as well as renewable enabling natural gas generation. These changes put Dairyland on the pathway to meeting its carbon reduction goal. The plan will create a more balanced generation portfolio to maintain stable rates and reliability for our members as energy markets experience increased price volatility due to extreme weather events, fuel supply disruptions and RTO's rapidly changing supply mix towards carbon-free resources.

Dairyland creates long-term load forecasts on a two-year cycle prepared in compliance with Rural Utilities Service (RUS) guidelines. The latest load forecast was completed in the fall of 2020 and for the 2022 budget, a refresh was created.

Dairyland utilizes load & capability to analyze current capacity requirements set by MISO and Encompass software to perform analytical modeling of energy. The model was chosen for the capabilities of being able to perform detailed variable production cost modeling, along with capacity expansion modeling within the same software. Other factors considered were the ease of the user interface, and the decision by the Minnesota PUC and utilities to switch to the Encompass software. To ensure accurate and reliable modeling results, the results are scrutinized by senior leaders in Dairyland's Finance, Operations, Market Services, and Environmental departments.

Dairyland follows the standards set by MISO resource adequacy planning reserve margin requirement, and directives set by the Dairyland board of directors. Dairyland considers fuel types, flexibility, contract terms, and asset ownership when developing and maintaining a diverse portfolio of power supply resources. Those factors help achieve reliable, low-cost service to our members and reduce Dairyland's carbon dioxide emission rate.

Key input assumptions used to model system and market conditions, include plant characteristics, generator costs, Hitachi ABB's power reference case, and Dairyland's long-term load forecast. Other factors considered in the analysis are price risk exposure, operational flexibility, resource deliverability, and resource location. Potential new resources are also evaluated on their impact to Dairyland's carbon reduction goal. Sensitivities are performed on the load forecast to reflect low and high load scenarios. Other sensitivities are performed around different market conditions, such as high gas, low gas, and CO2 tax. Dairyland analyzes all sensitivities to evaluate risk, reliability, and cost impact to our members. In the short-term, Dairyland has chosen a high gas scenario which is reflective of 2023 CME Group, Henry Hub futures and base load. In the long-term, our chosen scenario is based on Hitachi ABB's base case scenario and base load.

Dairyland also submitted the 2021 MN Optional-Integrated Resource Plan (MN O-IRP) as part of the response to the utility resource planning data request.